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UNITED STATES DEPARTMENT OF AGRICULTURE
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NEWS LETTER

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TRANSFER OF MORMON CRICKET AND GRASSHOPPER CONTROL PROJECTS

During the past several years the administration of control work in connection with outbreaks of Mormon crickets and grasshoppers has been under the supervision of the Division of Cereal and Forage Insect Investigations and was directed by persons primarily assigned to investigational and research work on these insects. This additional work has materially interfered with the research programs, because the control work is conducted during the season when progress in research work is most important.

In keeping with the organization of the Bureau's work, it seems desirable to transfer the control activities to a division dealing exclusively with control work; therefore, any Federal control projects dealing with these insects undertaken during the spring and summer of 1938 will be placed under the direction of the chief of the Division of Domestic Plant Quarantines, B. M. Gaddis.

In making this change it is, of course, intended that the control operations will be carried on in close cooperation with the specialists of the Bureau connected with investigational work on these insects and the fullest utilization will be made of technical information developed by them.

FRUIT INSECT INVESTIGATIONS

Limb bands vs. trunk bands for codling moth control.--M. A. Yothers, of the Yakima, Wash., laboratory, has completed a test to determine the relative efficiency of placing beta naphthol- and oil-treated bands on the limbs instead of on the trunks of apple trees, and also of placing them on both limbs and trunks. When limb bands were used instead of trunk bands, 34 percent more codling moth larvae were caught, and the number caught by trunk bands was increased 60 percent by also using limb bands on the same trees. Limb bands require twice as much banding material as trunk bands and correspondingly more labor.

Fumigation of dried peaches.--H. C. Donohoe, of the Fresno, Calif., laboratory, carried out a series of tests to compare fumigation with shade-cloth protection, previously found effective when used on ranches to cover peaches while drying on stacked trays and during storage in picking boxes. Chloropicrin was used at the rate of about 1 pound per ton. After drying on stacked trays the experimental fruit was infested by the raisin moth (Ephestia figulilella Greg.) to the extent of 42 percent of the halves. Storage without further treatment allowed this infestation to increase to 99 percent. Unprotected storage followed by fumigation resulted in reduction of established infestation to 18 percent. Some of the same peaches were fumigated at boxing, after drying, and samples taken immediately after the fumigation were 0.26 percent infested. After this fruit had been stored without shade-cloth protection it was 100 percent infested, but when it was stored under cloth the average infestation was 12 percent. A portion of the peaches that were 0.26 percent infested after fumigation at boxing were stored without protection and fumigated again after storage. These averaged 4.8 percent infestation. The figures given are averages of five lots in each case. The periods of storage in boxes ranged from 12 to 18 days. The samples were examined 45 to 51 days after collection.

Studies of the peach borer in Illinois and Indiana.--O. I. Snapp, of the Fort Valley, Ga., laboratory, has been cooperating with State workers in experiments in the control of the peach borer in western New York and southern Illinois. Observations in New York indicated that more than 1 year may be required for the larval feeding period of some individuals in that area, as a number of practically full-grown borers were found early in October which could not have attained that size from eggs hatched in the present season.

Laboratory tests of insecticides for Japanese beetle.--W. E. Fleming, of the Japanese beetle laboratory at Moorestown, N. J., reports on tests carried on during the 1937 beetle season with various insecticidal materials for the Japanese beetle. Among the materials tested as repellents were a number of samples of derris impregnated with different codified materials by the Division of Insecticide Investigations in order to inhibit the decomposition of the derris by sunlight. The results were negative and indicated that the impregnation of derris with these codified materials not only did not increase the repellency of the derris but in some cases reduced the initial repellency without inhibiting the decomposition of the derris. The results also indicated that measuring the decomposition of rotenone by chemical means may offer no clue as to the effectiveness of the material as a Japanese beetle repellent. Oat flour, which has been reported as being of value in inhibiting rancidity in oil and fat-containing foodstuffs, proved to be of no value in inhibiting the decomposition of the repellent ingredient in derris. Ammoniacal copper sulphate when added to derris likewise did not modify the repellent value of the derris. Further tests with the derris-rosin residue emulsion combination now recommended for protecting early ripening peaches and plums from beetle attack, showed that at least three of the rosin oils can be substituted for the "rosin residue" in this spray. Preliminary tests with finely ground derris (passing through 200-mesh screen) indicate that the more finely ground material may be somewhat more effective as a repellent than are the coarser forms.

Chickens as probable agents in dissemination of diseases of Japanese beetle larvae.--R. T. White and S. R. Dutky report on tests with chickens fed on larvae infected with milky disease organisms and with others injected with spore suspensions of the organisms. It was found that chickens feeding on diseased larvae pass out viable and infective spores in their droppings, infection tests showing no reduction in the infectivity of such spores as compared with those taken directly from diseased larvae. It was also found that feeding diseased larvae to chickens or inoculating chickens with spores by intravenous injection produced no outward evidence of disease and the growth rates of inoculated chickens are comparable to those of uninoculated controls kept under similar conditions. The injected chickens received a total of 3 billion spores in a series of four injections over a period of 4 months. These experiments were conducted at the Moorestown labatory.

MEXICAN FRUIT FLY CONTROL

A 3-year summary.--Throughout the last 3 years, ended June 30, 1937, traps operated in Texas took 437 *Anastrepha serpentina* Wied. Since July 1, 1937, these same traps have taken 497 of this species and 349 were trapped in October. Of this number, 197 were females. Only two of them, however, showed any signs of egg development. In addition to the *A. serpentina*, other flies not known to have hosts in the lower Rio Grande Valley were trapped as follows: *A. acidusa* Walk. group, 7; sp. "Y", 2; *A. striata*, 1; and one other specimen rarely taken in the valley traps, belonging in the *A. pallens* Coq. group. No adult *A. ludens* Loew has been trapped in Texas since July nor have any larvae been found in this season's crop. The specimens identified in October were as follows:

Species	Texas	Mexico
Adults	Number	Number
A. ludens	0	1
A. serpentina	349	8
A. acidusa Walk	7	0
Anastrepha sp. "Y"	2	0
A. striata Schin	1	1
A. pallens	65	0
Pseudodacus sp	1	0
Total	425	10
Larvae		
A. ludens [1]	0	122
A. serpentina [1]	0	56
A. striata [1]	0	5
A. pallens	0	4
Rhagoletis sp [1]	0	110
Total	0	297
Grand total	425	307

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[1] From market fruit.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Variation of infestation in fly-test nurseries.--E. T. Jones, Manhattan, Kans., reports: "On September 7 and 8 the most extensive hessian fly resistance-test nursery we have yet attempted was sown at Springfield, Mo. In addition to 1,800 8-foot rows, representing 1,180 selections and more than 300 varieties of spring wheat, principally foreign plant introductions hitherto untested for fly resistance, a similar nursery containing a duplication of the 1,180 selections was sown simultaneously at Manhattan by H. R. Painter. In addition to these selections, consisting principally of F_3 crosses and back crosses of winter wheats with selections carrying fly resistance from Marquillo, several hundred F_5 selections stabilized for fly and rust resistance have been turned over to J. H. Parker for agronomic study, improvement, and final disposition. Incident to the extremely dry weather of the past season, desiccation of larvae and consequent late emergence of flies, little or no infestation can be found in Manhattan and vicinity. Although the plots were cultured for infestation, examinations continued to October 15 have shown no eggs on plants in the Manhattan tests. A similar condition has prevailed at Junction City, Kans. Turkey wheat from the borders of our early sown test nursery there have a light infestation of eggs and 12 percent infestation of red larvae. Dissection of puparia from stubble plowed under on August 10 shows 62 percent desiccated larvae, only 13 percent total (but recent) emergence, and 100 percent living larvae of which 75 percent have pupated, a very unusual condition. Representative samples of Marquis plants from Springfield borders show a plant infestation of 72 percent, tiller infestation of 59 percent, and an average intensity of four puparia per plant. Almost no white larvae are present but the plants carry a heavy second fall-brood egg infestation of more than 218 eggs per plant. If the larvae can develop before severe frost, all susceptible plants and lines in our Springfield tests will be annihilated by infestation."

Bantam sweet corn tests for corn borer resistance.--M. Schlosberg and R. Mathes, of the Toledo, Ohio, laboratory, report that of a group of 71 Bantam sweet corn strains tested in 1937 for resistance to the European corn borer, comprising 29 inbred lines and 42 hybrid crosses, 2 of the inbred lines gave evidence of resistance on the basis of the departuro of their resultant mean borer populations from their expected borer populations, based on their relative conditions of development at the time of infestation of the strains, using as a criterion of resistance a negative departure of approximately twice the standard error of estimate. The same strains were found resistant on a similar basis in tests conducted with 61 Bantam strains in 1936. The inbred lines are 1828, obtained from the Michigan Agricultural Experiment Station, and 26-34, obtained from the Minnesota Agricultural Experiment Station. The inbred line 1828 was derived from a cross containing as one parent an inbred line of Maize Amargo, a strain of field corn which, although found to be agronomically undesirable, appeared resistant to corn borer attack. None of the other strains showed a negative departure of actual from expected borer population of at least twice the standard error of estimate.

Grasshopper population reduced in coastal counties of California.--C. C. Wilson, of the Sacramento, Calif., laboratory, reports that in a recent survey of the coastal counties the number of grasshopper egg pods showed a material reduction since the survey in 1936. On many egg beds, examinations of samples of soil showed fewer than 1 egg pod per square foot; whereas, at the peak of the infestations in 1935, from 90 to 1,200 egg pods were recorded in these same egg beds. Apparently only a little bait will be necessary in this locality. However, if climatic conditions are favorable, hoppers may migrate into cultivated crops from the wide expanses of rolling hills, which are normally infested.

Egg predators take heavy toll of grasshopper eggs in California.--Mr. Wilson also reports that an egg survey in San Luis Obispo County, where 440 square-foot samples from 43 egg beds were examined, indicated a material reduction in grasshopper egg deposition. There was a decrease of 43 perent in the number of eggs deposited in 1937 over that of 1936 and an increase of 29 percent in the number of egg pods attacked by bee, fly, and blister beetle. It is believed that these predators will constitute a material factor in the reduction of the prospective grasshopper population in 1938. The following table shows a comparison of the egg pods deposited in 1936 with those deposited in 1937 and the percentage of egg pods attacked by predators.

Year	Total egg pods	Total predators	Egg pods attacked by predators
	Number	Number	Percent
1936-----	2,188	675	30.8
1937-----	1,108	657	59.2

Distribution of grasshopper egg parasite throughout grasshopper area in Imperial Valley.--Examination by Mr. Wilson of alfalfa fields throughout the major grasshopper area in the Imperial Valley, Calif., indicated that the hymenopterous egg parasite *Scelio* n. sp., is widespread throughout the alfalfa-growing district. A second recovery was made 15 miles northeast of the place where the parasite was first collected in the spring of 1937. Preliminary examinations indicated that from 9 to 14 percent of the egg pods were attacked.

Second generation of lesser migratory grasshopper damaging crops in Imperial Valley.--Mr. Wilson also reports that examinations of the alfalfa fields throughout the Imperial Valley, Calif., indicated that serious damage may be expected from the depredations of *Melanoplus mexicanus* Sauss. This species was observed in stages ranging from second instar to adult, most individuals being in the fourth and fifth instars. The population was estimated to be 15 to 85 grasshoppers per square yard, on approximately 50,000 acres. In a number of fields the egg pods averaged 18 per square yard, and these will probably hatch this fall, causing considerable loss, unless measures are taken for control. Bait is being mixed and distributed by agricultural commissioner B. A. Harrigan.

JAPANESE BEETLE CONTROL

Fall shipments of nursery stock increasing.--Very dry weather during the early part of the month somewhat delayed the fall shipping season of nursery stock; however, activities increased appreciably in most sections by the middle of the month. In New Jersey over 250,000 plants intended for shipment to points outside the regulated area were certified during the month. Shipments were heaviest from South Jersey. Plant shipments from the Philadelphia, Pa., sector were heaviest to Southern States, over 143,000 plants being certified for shipment to Georgia and over 110,000 to Florida in October. Nursery and greenhouse inspection work increased considerably on the Eastern Shore of Maryland. One large establishment which specializes in fruit trees presented an inspection problem somewhat different from any other in this section. Instead of the usual sandy loam predominant in this territory, the soil in which the trees were grown is heavy clay which sticks to the roots and does not shake off readily nor wash off when dipped in the usual manner. It was found necessary, although slower and more tedious, to wash the roots of the trees with a pressure hose in order to clean them satisfactorily for inspection.

Inspectors supervise fumigations and treatments.--A total of 13 treatments conducted at 9 different establishments, 7 with a classified status, were supervised by inspectors in the New York City area. At one of the largest unclassified establishments on Long Island, 1 greenhouse was fumigated and 32 azaleas were treated with paradichlorobenzene as a demonstration. Some supervision has been given the State men who are treating the infested portion of the large nursery at Towson, Md., with miscible carbon disulphide emulsion. One quart of the emulsion, consisting of 1/2 part castor-oil soap, 1/2 part potash cocoanut-oil soap, 3 parts water, and 10 parts carbon disulphide, is being used to 50 gallons of water. Inspectors in northern New Jersey treated over 14,000 plants at 1 nursery with paradichlorobenzene. They likewise treated over 1,100 plants in the field of another nursery with carbon disulphide.

Restrictions on the movement of cut flowers lifted.--Discontinuation of the restrictions on the movement of cut flowers after October 15 resulted in the dismissal of several inspectors assigned to this work. In the Philadelphia, Pa., area, 109 beetles were removed from cut flowers during the inspection period. Beetles were found on cut flowers in this area as early as June 15, the opening day of the season, and the last beetles to be found were removed on October 1. Inspection at the wholesale cut flower houses in all sections continued until the quarantine was lifted.

Slightly fewer sand shipments from New Jersey.--Certification was granted during the month on approximately 270 cars of sand in the New Jersey area, somewhat under the amount certified during October last year.

Last beetles in the Philadelphia area.--The last outside find to be reported in this area was on October 15, when a beetle was picked from a canna plant in Fairmount Park, Philadelphia.

Dutch elm disease sanitation activities.--Selective cutting and clear cutting has been started in several areas where there is an abundance of diseased trees or where it is difficult to scout thoroughly. These areas are to be extended beyond the infection limits to natural boundaries, such as streams and roads, so that they may be well defined. An area in Clifton, N. J., having a localized concentration of diseased trees, with probable source of inoculum coming from a wood pile, was the first to be clear cut this fall. By the end of the month similar work was going on in most of the counties in the New Jersey infected area. A change in sanitation methods approved this month allows the stumps of removed trees to be 12 inches high, except on lawns or along curbs and roadways. Previously, the procedure was to cut stumps as low as possible. Trees under 2 inches in diameter will be grubbed out, whereas stumps of small trees are to be left from 6 to 8 inches. It is expected that this change will speed up the work and allow for a better chemical treatment of the stumps.

Root grafts spread infection.--A diseased tree eradicated during the last week of the month in New Castle, Westchester County, N. Y., almost escaped detection. No evidence of the disease was found in samples collected on August 25 and September 16. Graphium was finally isolated from specimens collected on October 21. Examination of the eradicated tree disclosed that streaking was well distributed throughout the larger limbs of the crown, but had not reached the tips of the branches where samples for laboratory diagnosis are usually cut. Research men of the New York State Department of Agriculture and Markets were able to culture Graphium from samples taken in August from a few small water sprouts. Entry of the disease apparently took place through root grafts with another elm 11 feet away, which was previously confirmed and removed.

Considerable decrease in confirmations for several areas.--A comparison of the number of diseased trees found in New Jersey in 1936 and up to October 16, 1937, reveals a general decrease for the entire State of 20 percent. Several lightly infected counties in which more extensive scouting had been performed showed increases. Eight counties in the infected area had decreases ranging from 16 to 60 percent. Staten Island, N. Y., shows a significant decline in the numbers of diseased trees reported since 1933, as follows: 18 in 1933; 153 in 1934; 326 in 1935; 70 in 1936; and 31 in 1937 up to October 25.

Dutch elm disease data.--Reports were received from the Morristown, N. J., laboratory during the month, confirming 378 trees as having Dutch elm disease. Of these, 327 were in New Jersey, 47 in New York, and only 2 in Connecticut. The remaining 2 cases were in Wileys Ford, W. Va., outside the general disease area. A total of 27,915 trees have been confirmed in all areas to date. Total trees removed to date in clear-cut areas number 1,216,094; dead trees removed number 2,231,146. The grand total of all trees removed to date in clear cutting, eradication, and sanitation activities is 3,507,085.

New infection centers in New Jersey.--Two new centers of infection have recently been found in New Jersey--one in Tewksbury Township, in Hunterdon County, and the other in Green Township, Sussex County. The latter infection may be connected with the concentration in Allamuchy Township, Warren County. These new finds are partially responsible for the large number of confirmations reported early in the month for New Jersey.

Elm shipment certification refused.--Certification of four Chinese elms, intended for movement from Albertson, N. Y., to the United States Post Office Planting, Hamburg, N. Y., was refused by inspectors of the New York City office. Although eligible for certification under the Japanese beetle quarantine, certification could not be granted, as the shipment was destined to a point outside the area regulated on account of the Dutch elm disease.

Horses select elm trees for destruction.--An unusual condition has been found in northern Marion County, Ind. Approximately 1,000 elms that had been girdled by horses were discovered on a 500-acre farm which is used as pasture by about 100 horses. A similar condition on a much smaller scale was found on other farms. The horses apparently attack only elm, primarily American elm but occasionally a slippery elm.

Further confirmations at Wileys Ford, W. Va.--Two additional trees at Wileys Ford, W. Va., have been confirmed as having Graphium, bringing the total of diseased trees discovered in this area to five. Both trees were near previously confirmed elms. All trees in the immediate vicinity of the infected elms are being sampled and pruned.

Scouting results in Pennsylvania negative.--All field work was terminated in the Pennsylvania protective band on October 9. Approximately 1,100 suspects were collected during the season but no cases of Dutch elm disease have been reported.

European bark beetles discovered in new areas.--Infestations of Scolytus multistriatus Marsh. in several new locations have been reported by the Morristown, N. J., laboratory. This insect carrier of the Dutch elm disease was located in Antietam, Md., Bardane, W. Va., and several points within 30 miles of the latter area.

Hardwood pulp moved in large quantities.--An unprecedented number of requests for the inspection of hardwood pulp, moving by freight and truck from generally infested gypsy moth areas in northern Maine and New Hampshire to a pulpmill at Gorham, N. H., located in the lightly infested area, overtaxed the usual inspection facilities available in that area. Eleven additional men were assigned to inspect the shipments until other arrangements were devised. A recently perfected process whereby the pulp is turned into a hardwood sulphide, used in the manufacture of paper, rayon, and explosives, accounts for the sudden demand by the manufacturer. Investigation disclosed that the pulpmill, ignorant of the gypsy moth regulations, had contracted for 8,000 to 10,000 cords of hardwood pulp in the generally infested area for shipment to their plant at Gorham, N. H. It was also disclosed that a freight agent, in charge of several stations in the northern sections of Maine and New Hampshire, had authorized the movement of approximately 40 cars of pulp from the generally to the lightly infested area without previous inspection and certification. Gypsy moth inspectors, with the cooperation of the carrier, have located practically all these cars, thoroughly cleaned them, and burned the refuse removed from them. Under a special arrangement, all incoming shipments are now carefully checked by an inspector at the mill, the pulp is milled immediately, the bark burned, and the trucks and cars are thoroughly cleaned as unloaded. These precautions make it possible to dispense with the inspectors first added to handle the actual inspection work. Approximately 300 egg clusters were removed from all pulpwood shipments during October.

Seasonal movement of evergreen products under way.--Shipments of evergreen products, such as boughs, trees, and roping, began to move from the regulated New England section during the latter part of October. Several gypsy moth inspectors are now busily engaged in the inspection of these products. During the 1936 season, 23 temporary inspectors were employed in the inspection of Christmas trees and other evergreen material used for Christmas decoration.

FOREST INSECT INVESTIGATIONS

Bark beetle control operations on the Coeur d'Alene.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports that the Forest Service, under the technical advice of the laboratory, is conducting artificial control on the Coeur d'Alene National Forest to eliminate five potentially dangerous "hot spots" of mountain pine beetle infestation in white pine. This project was instituted in October and will be completed the latter part of November, with approximately 4,000 trees being treated. These five rather small areas of severe infestation were disclosed during a survey of the forest conducted by the laboratory in August and September.

Bark thickness limits mountain pine beetle attack.--W. D. Bedard, Coeur d'Alene, reports that it was found that bark thickness, rather than height or diameter of the tree, was the factor that governed the height of insect attack. Regardless of the size of the tree, bark thickness at the top of the infested length ranged only from 0.2 to 0.4 inch. Although at any given height there was a wide variation in bark thickness within any diameter or height class, the taper in bark thickness from the base to the top of the tree was fairly constant. In other words, although bark thickness varied considerably at any given height, the decrease in thickness was fairly regular from the base to the top of the tree. With this variation in bark thickness within height and diameter classes it is apparent that there would be a wide range in infested length if it were correlated with either of these two factors. On the basis of bark thickness, the range in infested length is greatly diminished, and when the correlation is made on both bark thickness and height of tree, the range is even more materially lessened.

Locust borer injury not so severe in southern part of the Central States region.--R. C. Hall, Columbus, Ohio, reports that the analysis of data from 440 sample plots, established in the States of Ohio, Indiana, Illinois, Kentucky, and Tennessee, indicates that locust borer damage is much less severe in the southern part of the region than in the northern part. For example, for an average site index of 50 feet in Tennessee the average injury index is 49 percent, whereas for northern Ohio the same site yields an average injury of 80 percent. There appears to be a definite gradient in injury, progressing from high to low, from northern Ohio to southern Tennessee. A summary table of this gradient follows:

Region	Site index	Injury index
	Feet	Percent[1]
Northern Ohio---	50	80
Southern Ohio---	50	76
Indiana---------	50	72
Tennessee-------	50	49

[1] Injury index: 0, no injury; 1-33, light injury; 34-66, medium injury; 67-100, severe injury.

Oviposition responses of locust borer.--W. L. Baker, Columbus, reports that a preliminary analysis of data bearing upon oviposition responses of the locust borer, as obtained at Minerva, Ohio, this season, indicates a strong positive reaction to relatively high temperatures ranging up to 70 or 80° F. but a definite negative response as the temperature rises into the 90's. Continuous observation of several ovipositing females on comparatively cool days (air temperatures ranging from the high 60's into the middle 70's) showed a very marked tendency of the females to migrate around the trees from east to west as the day advanced, thereby remaining in an environment from 5° to 10° warmer than that on the shaded sides of the trunks. However, when the air temperatures ranged from the low to the high 80's the beetles showed the reverse reaction. At this time the bark temperatures in the sun ranged from the low to the middle 90's, whereas on the shaded sides they were as much as 16° lower. A series of records was taken of light intensities at the point of deposition of each egg, a total of 462 separate instances of oviposition being observed. General observations indicate less dependence of the females on light intensities than on temperature, inasmuch as during the coldest days and the morning hours of all days involved, cases of oviposition were rare or absent, although the light was as strong as during the days and hours of maximum oviposition.

Locust borer survival for the Cambridge, Ohio, experimental area.--H. C. Secrest, Columbus, reports that the partial analysis of activity records for Cambridge, Ohio, for 1937 indicates that the survival of locust borer larvae from early spring to the time of cutting of emergence holes was about 20 percent. The survival of prepupae and pupae was about 57 percent, making a total survival from early spring larvae to emergence of adults of about 11 percent. The data are summarized as follows:

Survival of stages	Number	Percent
Total larvae in spring-------------------------	2,449	--
Larvae cutting emergence holes-----------------	488	--
Survival of larvae based on emergence holes cut	--	19.9
Adults emerging--------------------------------	276	--
Survival based on adults emerging--------------	--	11.3
Survival of pupae and prepupae-----------------	--	56.6

New distribution records for smaller European elm bark beetle.--Scolytus multistriatus Marsh. is considered the most important insect vector of the Dutch elm disease fungus in the United States. It was first found in the vicinity of Boston, Mass., in 1909. Until 1936 the insect was known to occur in only two distinct areas. One covered parts of eastern Massachusetts and southeastern New Hampshire. The other included parts of western Connecticut, southeastern New York, eastern Pennsylvania, northern Delaware, and northern New Jersey. In 1936 scouts connected with the Bureau's Dutch elm disease eradication unit found S. multistriatus at Parkersburg, W. Va. Since then that unit and the Morristown, N. J., laboratory have cooperated in getting additional information concerning the distribution of the species. C. W. Collins, Morristown, reports as follows concerning the results of this scouting: "S. multistriatus has been found to be well established in a large contiguous territory including parts of West Virginia, Ohio, Indiana, and Kentucky, bordering on the Ohio River from East Liverpool, Ohio, to Evansville, Ind. The known infested area lies mostly in Ohio and West Virginia. At some points in Ohio it extends back from the Ohio River approximately 50 miles and at some points in West Virginia approximately 60 miles. Two other infested areas have been found. One is about 225 square miles in extent and lies just south of Pittsburgh, Pa. The other area includes six localities where the beetle has been found in the vicinity of Martinsburg, W. Va. Five of these localities are in West Virginia and one is in Maryland."

Beech scale infestation increases in Maine.--R. C. Brown, of the New Haven, Conn., laboratory, reports that an examination made by L. D. Casey early in October of the permanent plots in Maine indicated a definite increase in the beech scale infestation. In a great many instances the scale infestation was from medium to heavy near the base of trees in 1936 but the infestation now extends to a height of 25 to 50 feet from the ground. No marked increase in mortality of trees over that recorded in 1936 was observed. The predator Chilocorus bivulnerus Muls. is apparently unable to check the progress of the infestation in Maine. The infestation in Scarsdale, N. Y., remains very light. Judging by the large number of Chilocorus in this area it appears that the infestation here is held in check by the feeding of this predator.

European spruce sawfly in New Hampshire.--H. J. MacAloney, New Haven, reports that a survey of mature spruce stands on the White Mountain National Forest in New Hampshire revealed that the European spruce sawfly was present in extremely small numbers. The same condition prevailed in Coos County, N. H., where large areas of spruce occur.

Light infestation of spruce bark beetle.--J. V. Schaffner, Jr., New Haven, reports that a reconnaissance of mature spruce stands on the White Mountain National Forest in New Hampshire was made early in October to determine the status of Dendroctonus piceaperda Hopk. One infested tree was found near Camp A of the Parker Young Company in the area of the east branch of the Pemigewasset River. On the Broad Tray Ridge Trail and another trail leading down toward the Waterville Valley Inn, a few infested and dead trees were found. Based on the number of trees apparently killed by this pest in this area in the last 1 to 5 years and the number of trees now containing broods, the indications are that the infestation is not noticeably increasing.

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Notes on the biology of Matsucoccus.--Thaddeus J. Parr, New Haven, reports as follows on Matsucoccus sp. on pitch pine: "Early in the month the scales, having completed the second molt, began emerging from the holes in the bracts and traveled from the tips to the bases of the branches. The emergence continued until the third week, when all except those that had died from drowning in pitch, or for some reason were unable to push up out of the holes, had found shelter under the bark scales on the large branches and trunk, in some instances even down the main trunk to the ground. The mature females crowd into any small crack or crevice in the bark, where they are protected from above, and begin egg laying. Typically, the eggs are laid in a flat, elliptical pad behind the female. The pads of eggs are covered with woolly wax and contain a relatively large number of eggs. One counted contained over 400, with a few mature eggs still remaining in the body of the female. Egg laying continues at the present time and it is thought that the insects will overwinter in the egg stage."

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Heavy winds improve scouting conditions.--Scouting conditions were materially improved over the entire gypsy moth infested area during the latter part of October. Two severe rainstorms, accompanied by winds that sometimes reached gale force, stripped the foliage from most of the deciduous growth in many areas.

Intensive scouting near Canadian border makes rapid progress.--The areas adjacent to gypsy moth infestations discovered during the last fiscal year in the eastern section of Washington County, Maine, are now being scouted intensively by a special crew supervised by a permanent agent of this activity. Examination of a large woodland area in the vicinity of the Indian Township infestation was completed during the first part of October. Similar work was performed in the vicinity of the old infestations in Machiasport, Trescott, and Cooper, and the crew was working in Princeton at the end of the month. All of these towns are near the border of the Province of New Brunswick, where several small infestations were found during the last fiscal year by employees of the Dominion of Canada. No gypsy moth infestations were found in Washington County up to the end of October.

Scouting work expedited in more perilous sections of Vermont.--Gypsy moth scouting crews working in the more rugged sections of Vermont are making an effort to complete work in the most dangerous localities while the footing remains good. The work in some of the towns in the barrier-zone section of Vermont has been completed and considerable scouting has already been accomplished in several others, but no gypsy moth infestations have been found in this section.

Small infestations in barrier zone attributed to spread by wind.--Some single-egg-cluster infestations of the gypsy moth were discovered in the southeastern section of the Massachusetts portion of the barrier zone during the fiscal year 1937 which were attributed to wind drift from infestations outside of the eastern border of the barrier zone. Several small infestations in the same section but in localities not examined during the fiscal year

1937, have been discovered this year. The size of the infestations indicates that they became established at the same time as those found last year and probably originated from the same source.

Ground work stressed in areas where most egg clusters were deposited in low places.--Most of the gypsy moth egg clusters discovered in Canaan and Salisbury, in the northwestern part of Connecticut, early in October, were found close to the ground. As similar conditions were noted in other parts of the area, field employees engaged in scouting and cleaning work in Connecticut and Massachusetts are taking advantage of the prevailing favorable weather to accomplish as much low work as possible before snow falls. Scouting of the upper sections of the trunks and the branches of the trees will be done after the ground work has been completed in these sections, or after the lower egg clusters are hidden by snow.

New infestation in Connecticut portion of barrier zone.--A gypsy moth infestation was found the first week in October in the southeastern part of the town of Sharon, on the western edge of the State of Connecticut and within the barrier zone.

Cordwood inspected before removal from infested area.--A considerable amount of cordwood, recently cut in the vicinity of a gypsy moth infestation in Canaan, Conn., has been trucked to the New Haven, Conn., area and thence to market in New York State. A force of men has been detailed to carefully examine this wood stick by stick before it is moved from the infested area, as a precaution against the transportation of the gypsy moth eggs to uninfested territory. All standing trees and shrubs in the immediate vicinity of the cordwood were also carefully inspected.

Progress of work at isolated infestations in New York State.--Employees of the New York conservation department and W. P. A. workers under the supervision of this activity, who have been employed in scouting and thinning work in the vicinity of the large gypsy moth infestation discovered last year in Shawangunk, Ulster County, had located no new egg clusters in that town at the end of October. However, a single egg cluster infestation was discovered in the adjoining town of Wawarsing. A small number of new egg clusters was found and treated by the C. C. C. camp force working in the region of the large infestation discovered last year in Putnam Valley, Putnam County. Both of these infestations are located in the southern section of the State. The situation is different at the infestation discovered last September on Trumbull Mountain in Hague, Warren County, which is situated much farther north, near the southern end of Lake Champlain. Very close ground work is being done in the vicinity of this infestation and additional surrounding territory is being scouted by a force of over 60 W. P. A. employees working under the supervision of the New York conservation department. Nearly 7,000 gypsy moth egg clusters had been creosoted by these men at the end of October.

Two infestations found on the banks of the Lackawanna River.--Scouting along the banks of the Susquehanna and Lackawanna Rivers and in the adjacent lowlands of the gypsy moth infested area in Pennsylvania was completed in October. All trees and shrubs were carefully examined and much rubbish, such as tin cans, boxes, barrels, driftwood of all types, and junk, deposited by the floods during the latter part of August, was closely inspected. The work in some sections was complicated by heavy layers of mud which covered the lower portions of the trees and much of the debris. More than 35 miles of river banks, extending through and beyond the area known or suspected to be infested by the gypsy moth, and including parts of 11 different townships, were inspected during this survey. All tree growth and debris on approximately 4,600 acres of open country and 190 acres of woodland were examined, and the work required more than 5,200 man-hours of labor. Two gypsy moth infestations were located, both in the boroughs of Taylor and Old Forge, in Lackawanna County. The infestations were about 3/4 mile apart and extended along the river bank, many of the egg clusters being located on debris close to the edge of the water. One infestation consisted of 302 new egg clusters and the other of 28. Neither of the infestations present serious control problems and should be easily eradicated.

Assembling cages fail to reveal new infestation in Damascus, Pa.--A gypsy moth infestation was discovered during the first week in October in the west-central part of Damascus Township near the village of West Damascus, Wayne County, Pa. Damascus is outside the Pennsylvania quarantined area and is on the border of New York State. This infestation is located approximately 7 miles northeast of the colony discovered in Dyberry in 1937. Twenty-five egg clusters were found in a small apple orchard adjacent to a woodland area consisting of approximately 90 percent maple and a 10-percent mixture of basswood, cherry, birch, hornbeam, and elm. Intensive scouting and clean-up work had increased the number of new egg clusters to 60 by the end of October. About the middle of July 150 assembling cages were set out in Damascus, 1 of which was within the infestation, but all of the cages failed to attract male gypsy moths. This, together with several similar instances in the past, conclusively demonstrates that assembling cages are not entirely reliable in locating gypsy moth infestations.

Clean-up work to eliminate spraying on shore of reservoir.--Several reservoirs, which are the principal source of water for thickly populated cities and towns in the Wyoming Valley, are located in Spring Brook Township in Lackawanna County, Pa. Spring Brook is near the center of the quarantined area and was heavily infested by the gypsy moth. Very thorough clean-up work is being done around the shores of one of the largest reservoirs in order to stamp out the infestation so that spraying need not be done next season within 100 feet of the water's edge.

Scouting was principal occupation of C. C. C. gypsy moth enrollees in October.--From the end of the burlapping season to the first of October, C. C. C. enrollees were principally employed in thinning and cleaning work at known gypsy moth infestations. As the leaves began to thin out during the first part of October, some of the men were trained for scouting work. More men were transferred to this type of control work as scouting conditions became progressively better and during the latter part of the month scouting became the major activity. Piles of forest debris and slash are burned on days when there is no fire danger, so that accumulations of such waste material may be kept at a minimum.

Efficient work by C. C. C. gypsy moth crew.--Large gypsy moth infestations are usually easily found, as some of the egg clusters are so situated that they can readily be seen, and intensive scouting in the vicinity discloses the remainder. As the size of the infestations becomes smaller they are increasingly difficult to locate. The work of the gypsy moth crew from the C. C. C. camp at Plymouth, Vt., demonstrates the efficiency and thoroughness necessary in regions where the infestations are small and scattered. This crew discovered 12 single egg cluster infestations in the town of Ludlow, 4 in Cavendish, and 1 in Mount Holly, several of which were not clearly visible. This scattering of small infestations indicates that they, like the scattered infestations in the Massachusetts section of the barrier zone, originated from wind spread from infestations to the east or southeast, from which the small caterpillars were apparently blown up a valley in the direction of Rutland and the barrier zone.

PLANT DISEASE CONTROL

Progress of barberry eradication in North Dakota.--George C. Mayoue, in charge of barberry eradication in North Dakota and Montana, reports that during the period July to October an average of 22 security wage earners were employed in North Dakota in making a farm-to-farm survey in Stutsman, La Moure, Richland, Ranson, Grand Forks, and Steele Counties, where many bushes were found during the initial survey. There had also been reports by school children and some severe rust outbreaks in recent years, indicating that possibly some additional bushes remained. This work resulted in the eradication of 160 bushes and seedlings on 7 different properties. In Montana control work in recent months has been confined largely to timbered areas in Flathead and Lake Counties, where 855 bushes and seedlings have been destroyed on 9 different properties. In Minnesota since July 1 approximately 140 security wage earners have made a survey for barberry bushes in an area comprising about 3,500 square miles in the southwestern part of the State. Crews were located in Nicollet, Mower, Watonwan, Nobles, and Rock Counties. Most of the bushes found were obviously escapes from old plantings. In addition to the work in the western part of the State, a complete survey of Houston County has resulted in the eradication of many isolated and large fruiting bushes. In view of the topography, wide distribution of barberries, and the fact that some bushes were planted in this county as early as 1850, a future reinspection of practically the entire county will be necessary to destroy new bushes that develop from seed. The following table summarizes the progress in eradication since July 1.

Type of property	Properties having bushes: Planted	Properties having bushes: Escaped	Total bushes: Planted	Total bushes: Escaped	Sprouting bushes	Seedlings
	Number	Number	Number	Number	Number	Number
Old-------	2	27	3	157	64	13
New-------	24	53	134	180	-	115
Total--	26	80	137	337	64	128

According to L. W. Melander, bushes found in Minnesota during the last few months have been widely scattered and many of them proved to be sprouts from planted bushes that farmers had unsuccessfully attempted to eradicate several years ago. In one instance it was necessary to remove barberries from a buckthorn hedge that had been planted in place of barberries voluntarily eradicated by the property owner. Mr. Melander comments as follows regarding the use of line markers: "In the October 1, 1937, Bureau News Letter (vol. 4, no. 10, pp. 21-22) there was discussion of various methods of marking lines for survey crews and mention was made of a new type of canvas marker that had a fine screen for release of the powdered line. This marker has now been used for barberry survey in Minnesota over a period of several months and has proved very satisfactory and efficient. Contrary to appearances, it is not the "swatter" type, but is used more on the order of a sponge to serve as a guide when working among trees and other objects. Where it is necessary to put line on foliage, it is a simple matter to shake the powdered line on the object to be marked. The supervisors who have been using these markers prefer them to other methods that have been used heretofore in Minnesota."

Scouting for blister rust in California.--The annual work of scouting for white pine blister rust in California was begun about the first of August. In 1936 five infections, one on sugar pine and Ribes and the others on Ribes only, were found in northwestern California, a few miles south of the Oregon boundary. These were the first discoveries of blister rust in California. This year infection on Ribes nevadense was found during the very first days of scouting on the Trinity National Forest, about 100 miles south of the discoveries of 1936. R. nevadense had never before been found infected in its native habitat. One bush, growing along a small mountain stream and scarcely eight feet from the water and at an elevation of about 4,500 feet, carried the rust. It was in good association with sugar pine. Notwithstanding a careful search of the vicinity, no more diseased bushes could be found. However, within 2 weeks four more infections on R. nevadense and R. cruentum were located about 10 miles to the south, and subsequently two infected R. sanguineum were found about 125 miles south of the Oregon-California line. A scouting party operating in the northern part of the Klamath forest found blister rust generally distributed in every drainage basin examined and principally in basins where no rust was observed last year. This indicates possible undiscovered pine infection centers probably to the north in Oregon, and exceptionally favorable conditions for the spread of the rust during the spring. Early in September another scouting party was sent into the Lassen National Forest, at the northern end of the Sierra Nevada. Shortly afterwards blister rust was discovered there on R. roezli on Mill Creek a few miles south of Lassen Volcanic National Park, and about 120 miles south of the Oregon boundary. This is the first known occurrence of blister rust in the Sierra Nevada, and affords the first tangible proof of the threat to the fine stands of sugar pine growing on its western slope. Thus the presence of white pine blister rust has been established in both the Coast Range and Sierra Nevada Mountains of northern California, at about equal distances south of the Oregon-California border. It should be clearly understood that many undiscovered Ribes infections undoubtedly exist both within and outside the area found infected this season. All scouting operations in the sugar pine region were terminated the latter part of October because of inclement weather and defoliation of the Ribes.

Camp reliefer carries on thriving laundry and cleaning establishment.--The Cow Creek blister rust camp in California has one full-fledged laundry and cleaning establishment in operation. Almost over night business became so good that the proprietor, a camp reliefer, had to take a partner. Ordinary service requires 2 days, but special 1-day service can be obtained at no extra charge. The shop consists of two ironing boards, gasoline iron, and a dry cleaning and tailoring tent. The operator does this work entirely on his own time. He puts in his regular 120 hours per month on Ribes eradication and operates the laundry and cleaning establishment on the side after hours. This work does not, in any way, interfere with his regular duties.

Preeradication survey on National Parks.--At the request of and in cooperation with the National Park Service, preeradication surveys have been started in the Lassen Volcanic, Yosemite, and Sequoia National Parks. The object of this work is to gather essential information concerning the abundance and distribution of Ribes and white pines as a basis for planning control operations.

Pine-disease survey in the western white pine region.--During the summer a pine-disease survey has been carried on in the western white pine region. The returns have now been tabulated from sample strips worked in 24 drainages of the St. Joe Forest area in Idaho. These drainages contain 182,700 acres of white pine land and 128,965 trees up to about 20 feet in height were examined in the stream and upland types. This work resulted in the finding of 16,831 infected trees, or 13 percent of those examined. These trees had a total of 70,474 cankers, or an average of 54.6 cankers per 100 trees examined. Last year's survey showed an average of about 4.4 percent infection in this region and the jump to an average of 13 percent this year indicates the rapidity with which the disease is attacking the white pine. Young trees, especially, are being severely attacked and considerable losses in unprotected reproduction areas are inevitable.

COTTON INSECT INVESTIGATIONS

Early versus late-planted cotton.--Observations were made by K. P. Ewing and R. L. McGarr on the damage caused by several insects to early and late-planted cotton in Calhoun County, Tex. In this area cotton planting began this year on March 22, and most of the early cotton was planted by April 8; however, a considerable acreage of late cotton was planted in June. The season was favorable for early maturity and the early planted cotton had produced a good crop by the first of July. Flea hopper damage was spotted and, on the whole, comparatively light in the early cotton. There was a heavy infestation of flea hoppers in the late cotton during the latter part of June and until the middle of July. Boll weevils were fairly abundant at the beginning of the season but they did not have time to build up sufficiently to cause maximum damage, especially in the open-prairie section, before the early planted crop matured. Many of the fields, however, had considerable weevil damage to the top crop and the late fields were severely damaged. Damaging infestations of the leaf worms appeared at about the normal time, though considerably later than in 1936. The early cotton practically escaped leaf worm damage, whereas most of the late cotton required from four to six applications of arsenicals to protect it from the weevils and leaf worms. The cotton bollworm was even more injurious to the late cotton and many farmers complained the damage this year was the worst they ever experienced. The combined attacks of the flea hopper, boll weevil, leaf worm, and bollworm reduced the average yield on 6,000 acres of late cotton to about 150 pounds of seed cotton per acre, and some of the fields produced so little cotton that it was not worth picking. The early cotton escaped serious insect damage and produced the best crop in the last several years, averaging about 865 pounds of seed cotton per acre on 19,000 acres.

Egg parasites of cotton flea hopper.--Studies were continued this season by H. J. Crawford, of Port Lavaca, Tex., on the biology and abundance of the egg parasites of the cotton flea hopper. Erythmelus n. sp. was found to pass the winter in the egg of its host in a stage not far enough advanced to darken the host egg. Emergence from overwintering eggs was observed from March 31 to May 15. The stage in which the other parasite, Anaphes anomocerus Gir., passes the winter was not learned. Erythmelus n. sp. oviposited in flea hopper eggs that were from 1 to 3 days old and adults emerged in from 10 to 12 days. Of the 30,610 flea hopper eggs collected this year from several host plants in 22 counties of Texas, 18.6 percent were parasitized by Erythmelus and 13.2 percent by A. anomocerus, or an average of 31.8 percent parasitization. The latter species was more abundant in flea hopper eggs deposited in horsemint in the spring and in bitterweed in the fall. In all other cases Erythmelus was either more abundant or the only species present.

Boll weevil resistant characters in cotton.--E. W. Dunnam and J. C. Clark, Stoneville, Miss., in their 1937 studies of the boll weevil resistant characters of cotton found the same trend in varietal characteristics as in the last two seasons. The results were more erratic this year, because normal rains were favorable for producing more succulent bolls than during the last two seasons. Six varieties of upland cotton with thin boll walls, six varieties with thick boll walls, and one variety of Sea Island cotton were compared for boll size, boll-wall thickness, toughness of carpel lining, fruiting habits, leaf drop, and extent of second growth. Two series of bolls were collected from each upland variety, one early and the other late in the season. Each series consisted of samples of 10 bolls ranging in age from 12 to 32 days, collected at 4-day intervals. In the thin boll wall types the maximum boll diameter averaged 3.59 cm in the early series and 3.37 cm in the late, and was reached in bolls from 24 to 32 days old in both series. The maximum toughness of the inner carpel lining of the bolls, as measured by a resistometer, was also found in bolls from 24 to 32 days old in both series. The average pressure required to puncture the inner carpel lining was 1,021 grams per square millimeter in the early, and 1,036 grams per square millimeter in the late series of bolls. The maximum thickness of the boll walls was found in bolls from 16 to 20 days old and averaged 2.3 millimeters in the early series. In the late series the maximum thickness averaged 2.0 millimeters in bolls from 16 to 32 days old. In the varieties with thick boll walls the maximum boll size occurred in younger bolls. In the early series of bolls the range in age was from 16 to 32 days and in the late series from 20 to 32 days. The bolls were also larger in the thick-wall types, averaging 3.90 cm and 3.60 cm in diameter in the early and late series, respectively. The maximum boll-wall thickness, averaging 2.7 mm, was found in bolls from 16 to 28 days old in the early series. In the late series the maximum thickness averaged 2.3 mm in bolls from 16 to 32 days old. However, the thick-boll walls were not so tough and required only 927 grams per square millimeter in the early series and 943 grams per square millimeter in the late series to puncture the inner lining. In both types of cotton the average boll diameter and the thickness of the boll wall decreased and the pressure required to puncture the inner lining increased as the season advanced. In the one series of bolls of Sea Island cotton the average maximum diameter was 2.95 cm in bolls 36 days old. The maximum boll wall thickness averaged 2.0 mm and remained the same in bolls from 12 to 52 days of age. The average resistance to puncturing the inner carpel lining was 564 g per square millimeter in bolls 52 days old, although this was only slightly greater than in bolls 24 days old. The walls of the Sea Island bolls were nearly as thick as the thin-wall upland varieties, but they were much softer and less resistant to weevil puncture over a longer period. Although the bolls on upland varieties grew larger early in the season, more time was required between the setting of bolls on a given fruiting branch. The time interval between the appearance of bolls early and late in the season was 5.78 and 5.53 days in the thin-wall and 5.87 and 5.37 days for the thick-wall varieties. The average percentage of leaves that dropped when the first crop matured was 17.0 percent for the thin-wall varieties, 5.8 percent for the thick-wall, and 5.0 percent for Sea Island. The average increase in plant heights due to second growth was 5.6 and 6.7 inches, respectively, for the thin- and thick-wall varieties. The thin-wall varieties produce smaller and tougher bolls at a faster rate, mature them more quickly, drop a higher percentage of leaves, and produce less second growth. All of these characters except the thin walls and small size of bolls are desirable in varieties to be grown where cotton is in danger of attack by boll weevil.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--This work was completed in the Southeastern States in October. A thorough inspection was made of the domestic-cotton area in north Florida and trash was obtained from a large number of the gins in Alabama south of Montgomery, and in Georgia south of Macon. In South Carolina 2 weeks' inspection was carried on in the extreme southern part of the State. Results were negative in these four States. Gin-trash inspection in Oklahoma was continued throughout October with 2 units in operation, the results being negative. In the Texas Panhandle pink bollworms were found in the regulated counties of Terry, Gaines, Andrews, Cochran, Martin, and Dawson. The area just outside this regulated zone was covered intensively with a number of machines in operation, with negative results. Pink bollworm infestation in the Pecos Valley of Texas and New Mexico, as determined by gin-trash inspection, was much heavier this season than at any time prior to 1937. Casual gin-trash inspection at a new gin at Deming, N. Mex., resulted in the finding of a fairly heavy infestation of pink bollworm in an area already under quarantine. Pink bollworms were readily found in gin-trash in the Safford, Ariz., area, although the number appears no greater than formerly. The Tucson, Ariz., area has apparently been free from pink bollworm infestation for several years. The pink bollworm appears to be present this season in all of the area from perhaps 10 miles north of Nogales to a few miles northwest of Tucson. This area is all under regulation on account of the Thurberia weevil.

Regulatory measures.--The tremendous production of cotton in the Texas Panhandle has taxed the facilities for ginning, compression, and oil mills; however, the facilities set up by this division for handling a normal crop of cotton under our regulations were capable of being expanded to take care of this unprecedented situation and there has been no complaint that movement of cotton products was delayed because of the pink bollworm regulations.

Destruction of stalks.--At the close of October approximately 99.5 percent of the original stand of cottonstalks had been destroyed in the lower Rio Grande Valley of Texas. The remaining 0.5 percent was either on acreage belonging to nonresidents who could not be located or on land in litigation. Stalks on some of this land were destroyed through cooperative movement on the part of nearby cotton growers. In fields in which the stalks were cut early in the season the stubs have sprouted and it is necessary for the inspectors to continue their contacts in order to have this stub cotton destroyed. It is not believed that any appreciable amount of material that could serve as a food for the pink bollworm has been allowed to form on the plants.

Road-traffic inspection.--The Marfa, Tex., road station, which guards the main road out of the heavily infested Big Bend district, was in operation during October, and inspectors attached to this station made a number of interceptions of cotton products infested by pink bollworm. Inspection revealed living pink bollworms. One lot of this infested material, had it not been intercepted, would have been carried to a noninfested section of Texas. Many cotton pickers launder their cotton-picking sacks before leaving the heavily infested Big Bend district so as to be able to pass them through the Marfa road station. The Mexican fruit fly service took over the road-traffic inspection station leading out of the lower Rio Grande Valley in October but several of the personnel, who were on this station while it was operated as a pink bollworm station, continue in service. They and the others assist in preventing cotton products from being illegally moved out of the lower Rio Grande Valley.

Thurberia-plant eradication.--Fewer plants than normal were found in the area which was covered during the month of October; however, a rather large territory was intensively covered and eliminated from further consideration.

Wild cotton.--Active eradication work was resumed in southern Florida during the last week of October. By the close of the month approximately 200 acres had been recleaned and approximately 20,000 plants had been removed. Of this number there were only 11 plants on which bolls had set. This indicates that the territory was left in good condition when the work was discontinued when the rainy season began. The wild cotton eradication work is being carried on with regular appropriation funds.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Control for red spiders and thrips on tomatoes and cucumbers.--C. A. Weigel and R. H. Nelson, of the Beltsville, Md., laboratory, report that experiments performed against Tetranychus telarius L. and Thrips tabaci Lind. on greenhouse-grown tomato and cucumber plants, in which four sprays were applied at 4-day intervals, gave the following results: A derris spray having a rotenone content of 0.0056 percent was as effective as one with 0.0012 percent rotenone content; the derris sprays used were superior to cube sprays of the same rotenone content, the difference being explainable on the basis of the total extractives content, which was 18.6 percent for the derris and 12.3 percent for the cube; the addition of pyrethrum extract aided in killing thrips but did not improve the effectiveness of the sprays against the red spider; with sprays of the same rotenone content, containing sulphonated castor oil as a spreader, the result was a better kill than when either alkylphenylbenzenesulfonic acid, or rosin residue, was used; a proprietary insecticide containing an aliphatic thiocyanate, diluted 1-300, was as effective against the red spider as the derris spray plus sulphonated castor oil, and did not harm tomatoes, while a proprietary insecticide containing lauryl thiocyanate diluted 1-600 burned the plants severely after only two spray applications. In a second series of experiments, using the same insecticides as in the first but applied four times at weekly intervals, approximately the same results were obtained, except that on tomatoes the spray containing derris, pyrethrum, and alkylphenylbenzenesulfonic acid appeared to be as effective as the sulphonated castor oil sprays. The spray containing lauryl thiocyanate caused severe injury to both foliage and fruit of tomatoes. None of the other sprays caused any permanent injury to either tomato or cucumber. Although sprays containing sulphonated castor oil caused a noticeable spotting of the fruits, this condition was practically obliterated by following the normal practice of syringing the sprayed plants with water within 48 hours after the insecticides were applied. On the whole, a beneficial effect from the spraying was clearly demonstrated, since on the sprayed plants the foliage remained greener and the plants continued to bear fruit much longer than did the comparable plants in untreated plots, and the average number of living red spiders on the treated plots was so diminished as to permit healthy growth of tomatoes and cucumbers.

Sulphur as a repellent against green clover worm.--Recent experiments by L. W. Brannon, of the Norfolk, Va., laboratory, designed to determine the relative effectiveness of derris, derris-sulphur, cube, cube-sulphur, pyrethrum-sulphur, and sulphur alone, applied as dusts or as sprays for the control of the Mexican bean beetle in association with the green clover worm infesting snap beans, showed that in general the dusts were more effective than sprays for the control of the latter insect on beans. The derris and cube dust mixtures contained 0.5 percent rotenone, the derris and cube sprays contained 0.015 percent rotenone, and the pyrethrum-sulphur dust mixture contained 0.1 percent total pyrethrins. Wettable sulphur was used as a spray at the rate of 2 pounds to 50 gallons of water. It was also noted that sulphur dust alone gave foliage protection against Plathypena scabra Fab. comparable with that obtained when sulphur was used in combination with derris, cube, or pyrethrum, and that a derris-sulphur dust mixture gave better protection than a derris-talc dust mixture. These results indicate that sulphur acts as a repellent against P. scabra and that in instances where this pest occurs in association with a Mexican bean beetle infestation, sulphur should be used as a diluent for derris or cube for the combined control of the two insects.

Sparse stands of Russian-thistle favor breeding of beet leafhopper.--In an investigation to determine the relationship between density of stand of Russian-thistle (Salsola pestifer A. Nels.) and its suitability for the development of populations of the beet leafhopper, D. E. Fox, of the Twin Falls, Idaho, laboratory, found that extremely dense stands of Russian-thistle dried prematurely and therefore were not suitable for the development of large populations of Eutettix tenellus Bak., whereas in areas where this favorite host plant of the insect was less abundant the population of E. tenellus increased progressively until fall. In stands where the Russian-thistle grew sparsely, the individual plants remained green and suitable as a host plant throughout the entire summer and early fall.

Wind velocity affects efficiency of rotenone dust mixtures against tobacco flea beetle.--The effectiveness of rotenone-containing dust mixtures against Epitrix parvula Fab. depends greatly on the wind velocity at the time of application, rather than on the time of day when such applications are made. This was demonstrated in a series of tests performed by W. A. Shands and his associates at the Oxford, N. C., laboratory. A series of applications of a dust mixture containing 1 percent rotenone was applied to small field plots at 6 a.m., at noon, and at 6 p.m. Although there was a slight indication that the maximum effectiveness was obtained when the applications were made at 6 p.m., the general conclusion was reached that this time of day coincided with the lowest wind velocity, and it appears that an effective mortality of beetles can be obtained by the proper application of the rotenone-containing dust mixture at any time of the day when the wind velocity does not exceed approximately 4 miles per hour.

Chemically pure isoamyl salicylate inferior to commercial grade in attractiveness to hornworm moth.--L. B. Scott, of the Clarksville, Tenn., laboratory, reports that tests with five lots of commercial isoamyl salicylate and one lot of this material which was chemically pure, show that the pure material was much less effective as an attractant to the moths of the tobacco hornworms Protoparce sexta Johan. and P. quinquemaculata Haw. than were any of the commercial brands. The pure material attracted only half as many moths as did the commercial material from which it was prepared and approximately one-third as many moths as the most effective commercial materials. Four of the five commercial materials attracted the moths in approximately equal numbers, whereas the fifth material appeared to be definitely superior to the other four. Future work is planned to determine the substance in the commercial material which functions most effectively as an attractant for the hornworm moths.

Insect damage to cigar tobaccos.--According to the reports of a survey performed by F. S. Chamberlin, of the Quincy, Fla., laboratory, in the Georgia-Florida shade-grown district, in 1937, it appears that the average loss on this type of tobacco attributable to hornworms (Protoparce spp.), the tobacco budworm (Heliothis virescens Fab.), and the tobacco flea beetle (Epitrix parvula Fab.) was 0.2, 0.3, and 1.7 percent, respectively. Although this survey was necessarily limited in scope, it is believed that it gives a fairly reliable index of the damage caused by the principal insects attacking cigar-type tobaccos in the area involved. It appears that in the absence of the preventive and direct control measures applied the insects mentioned would have seriously reduced the main part of the crop grown for cigar wrappers.

Wild peppergrass principal summer host of beet leafhopper in Arizona desert.--V. E. Romney, of the Phoenix, Ariz., laboratory, reports that extensive field observations during 1937 have corroborated observations in 1936 in demonstrating that one of the peppergrasses, Lepidium thurberi Wooten, is the principal host plant for Eutettix tenellus Bak. that reinfests other wild host plants in the Arizona desert areas after the early summer dry season. Mr. Romney has determined that L. thurberi is abundant in southern and southeastern Arizona and is the only plant, with the possible exception of very limited areas of Russian-thistle (Salsola pestifer A. Nels.), that sponsors E. tenellus during the early summer dry season. This plant is known to extend along the Mexican border for approximately 175 miles. Its distribution in Mexico is not known.

Dichloroethyl ether effective against wireworms and nontoxic to certain host plants.--M. W. Stone, of the Alhambra, Calif., laboratory, reports that a continuation of small-scale field plot tests with dichloroethyl ether in aqueous solutions of 6, 9, and 12 cc per gallon, applied at the rates of 1, 2, and 4 quarts, respectively, per plant, gave a mortality ranging from 67 to 100 percent of the wireworms, principally the sugar beet wireworm (Limonius (Pheletes) californicus Mann.), which were infesting tomato, corn, cabbage, and potato plants. No plant injury occurred to any of these enumerated crops, except in instances where the 12 cc dilution was applied at a dosage of 1 gallon per plant.

INSECTS AFFECTING MAN AND ANIMALS

Young chickens favorable host for Gulf coast tick.--In biological studies on the Gulf coast tick, H. M. Brundrette, of the Valdosta, Ga., laboratory, has found that young chicks are fairly good laboratory hosts for the tick larvae, except for the fact that the chicks die off rapidly even when they are kept under good conditions and receive the closest attention. Whether this mortality is due to common poultry diseases or to some condition or disease induced by the ticks has not yet been determined.

Eye gnats and "sore eyes" in the Southeast.--Continuing an eye gnat survey in the Southeastern States, J. T. Bigham reports that in the area from Thomasville, Ga., east to Valdosta, north to Tifton, and west to Albany through Camilla and Moultrie, and from Valdosta south to Bartow, Fla., through Gainesville, Ocala, and Orlando, eye gnats and sore eyes associated with them were reported to be generally a serious problem. In southern Georgia and northern Florida "gnat sore eyes" in the schools is confined almost entirely to the early fall. In central Florida "sore eyes" is reported to be prevalent during both the fall and spring. In many schools, a supply of citronella oil is kept on hand to treat the eyes of the students for repelling the gnats.

Wound-myiasis and the pH of wound secretions.--Studies on the pH of wound secretions by E. W. Laake, of the Dallas, Tex., laboratory, has yielded some important clues on the factors inducing wound infestation by screwworms. In guinea pigs it has been found that the mean pH value of the fluid of a fresh wound is 7.05. The pH of a wound infested with larvae of *Cochliomyia americana* Cushing and Patton increases slowly on the alkaline side during the first and second days of myiasis, but from the second to the third day there is a significant rise to a high of 7.31; then there is a rather uniform decrease to a value of 7.14 at the end of the myiotic period. During the post-myiotic period the mean values slowly drop but remain on the alkaline side of the scale for all pigs that die, whereas for all those that survive the mean pH drops over rather sharply to and remains well on the acid side. When guinea pigs showing acid, neutral, and alkaline wounds were exposed to screwworm flies it was found that the alkaline wounds were strikingly more attractive to the flies than were the acid wounds. In wounds having a pH of 6.1 to 6.3 no eggs were laid on two guinea pigs exposed, 5 eggs were laid on 5 wounds showing a pH of 6.5, whereas on 17 wounds showing a pH of 7.5, 469 eggs were laid.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Living larvae of the Mexican fruit fly (*Anastrepha ludens* Lw.) were intercepted at Laredo, Tex., on September 15 and 22 in apples in baggage from Mexico. Fifteen living larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) were intercepted at New York on September 9 in two hawthorn (*Crataegus* sp.) fruits in baggage from Italy. Three living larvae and three living pupae of the same fruit fly were found in the container. C. T. Greene reports as follows: "This record is interesting. It is my first record on hawthorn for this fly." An adult of the fruit fly *Anastrepha mombinpraeoptans* Sein (*acidusa* of authors) was taken in a trap in the field at Rio Piedras, P. R., on October 19. An adult of the weevil *Apion pomonae* F. arrived at Mobile, Ala., on July 6 in vetch mixed with rye straw in cargo from Scotland. A living specimen of the mirid *Ceratocapsus apicalis* Reut. was intercepted at Brownsville, Tex., on September 23 on a gardenia in cargo from Mexico. Four living larvae of the potato weevil (*Epicaerus cognatus* Sharp) were found at Roma, Tex., on September 25 in three potatoes in baggage from Mexico. Living specimens of the coreid *Leptoglossus membranaceus* Fab. were collected on July 7 on string beans in the field in Guam. This species is reported as also feeding on watermelons, cucumbers, cantaloups, and many other hosts in Guam. A living adult of the weevil *Apion maculaalba* Suffr. arrived at New Orleans on April 24 on a pineapple fruit in cargo from Cuba. Three living larvae and a pupa of the mango weevil (*Sternochetus mangiferae* F.) were intercepted at Seattle, Wash., on July 28 in three mango seeds in baggage from Hawaii. Living larvae and pupae of the mordellid *Mordellistena cattleyana*

Champ. were taken at Washington, D. C. on June 9 in orchid (Cattleya sp.) leaves in express from Brazil. The larva mines the parenchyma between the leaf surfaces. It does not leave the original leaf, either to feed or to pupate.

Weevils in the mail from Ireland.--Living adults of Apion virens Hbst. and Barynotus obscurus F. were intercepted at San Francisco on April 20, 1937, on primroses in the mail from Ireland. The tiny primrose plants were in soil. The weevils were probably accidental on the primroses. A. virens Hbst. is reported in European literature as common on red clover (Trifolium pratense). The shipment was refused entry and returned to sender, because it moved in violation of permit requirements, with prohibited soil, and on account of the presence of the insects listed.

Pathological interceptions of interest.--Diplodia tubericola (E. & E.) Taub. was found causing a rot of outer scales of a hyacinth bulb from the Netherlands intercepted at Boston October 6. This is our first report of the fungus on this host. A fungus determined by C. L. Shear as probably Guignardia vaccinii Shear was intercepted on August 25 at Washington on Vaccinium sp. from Saskatchewan. In giving the distribution of this disease, the Department's technical Bulletin 258 lists Nova Scotia only, in Canada. Two new hosts for Heterodera marioni (Cornu) Goodey were added to our interception file records, Andromischus trigynus intercepted at San Francisco October 4 from Germany and Pachyrhizus erosus at New York on October 22 from China. Leptosphaeria sp. was intercepted on October 25 at Philadelphia on rye straw from France. Neotylenchus, probably abulbosus, was intercepted on October 27 at Galveston in turnips from Wales. No Brassica species are listed as hosts of this nema in Goodey's manual. Phyllosticta sp. intercepted at New York on January 6 on holly leaves from Yugoslavia is said by the specialist to be clearly different from the species already named from this host. Puccinia angustata Peck was intercepted for the first time on October 29 on Scirpus sp. from Spain, at Philadelphia.

Narcissus treatment supervision.--During the season just past, 7,434 cases containing approximately 5,810,000 narcissus bulbs, were imported subject to hot-water treatment on arrival as a condition of entry. With the exception of a few small lots, most of which were received by mail, the treatments were applied, under the constant supervision of representatives of this Bureau, at privately owned plants. The cases were corded and sealed by the Bureau before delivery to the treating plants and at the latter points they were held intact until the inspectors could be present to break the seals and supervise the treatment. The treatments were applied at 11 plants in Washington (1,734 cases); 3 plants in Oregon (555 cases); 3 plants in California (113 cases); 1 plant in Illinois (84 cases); 2 plants in Michigan (55 cases); 1 plant in Massachusetts (41 cases); 8 plants in New York (3,181 cases); 3 plants in New Jersey (197 cases); 1 plant in Pennsylvania (284 cases); 1 plant in Maryland (463 cases); 2 plants in Virginia (434 cases); and 3 plants in North Carolina (295 cases). In addition, arrangements made provided for the application of treatments to approximately 55 shipments, totaling approximately 3,200 bulbs, which were received by mail.

DOMESTIC PLANT QUARANTINES

White-fringed beetle reported unimportant in South America.--Although the beetle has a wide distribution in Argentina and is considered somewhat harmful to crops planted in hard grounds and to crops in general, chiefly cereals, the insect is considered of no economic importance, according to a recent official statement by an Argentine Government entomologist. It is not often that adult beetles appear simultaneously in large numbers there, and even more rarely do they constitute a serious pest, he states. For these reasons a thorough study of the insect has not been made in that country. The white-fringed beetle is also reported to occur in other South American countries.

White-fringed beetle population.--Adult beetles were found the week ended October 30 near Florala, Ala., and Laurel Hill, Fla., and numerous beetles of Naupactus species were found the week ended October 9 at Saucier, Miss. At Pensacola, Fla., no beetles were found the latter half of October. Intensive house-to-house clean-up measures have been continued in this city, with the cooperation of local health authorities and railway agents. Larvae and egg masses were found near the last of October in fields and woodlands in areas previously known to be infested.

White-fringed beetle inspection and control.--In cooperation with pest-control officials of these States, 36 cities in Alabama, Florida, Georgia, and Texas, principally along the Gulf and Atlantic coasts, all outside the known infested area, were recently scouted for the white-fringed beetle, the work covering over 6,000 acres on more than 400 properties. Water fronts, railroad yards, woodyards, fertilizer plants, and premises of grain elevators, gins, cottonseed mills, junk yards, and other places were scouted, and data obtained on the routing of ships and the commodities received from foreign countries or from the infested States. No beetles were found in any of these cities. In the infested areas, intensive reinspection, investigation of industrial practices, and clean-up work were continued. Inspectors are placed at the one peanut-shelling plant and at cotton gins and cottonseed mills located in the infested areas or processing commodities produced in the infested areas. Over 1,000 permits had been issued through October for the movement of produce, chiefly cotton. Throughout the infested areas farms and woodlands are being surveyed and mapped as to acreage and kinds of crops produced, as a basis for recommending cropping and cultural practices and for other control action next spring.

Sweetpotato weevil survey and control.--During the Federal-State cooperative surveys in 84 counties in 5 States through October 31, the northern limits of sweetpotato weevil infestation have been defined in Alabama, Mississippi, Louisiana, and Texas. Outside of southern Louisiana, where infestation is heavy, 304 properties have been found infested in these States. Activities of county agents contributed largely to the excellent cooperation of growers. Thirty-five persons were employed on the project in October. Survey work was begun in Georgia on October 25, six State inspectors assisting. Inspection is now being made of sweetpotato tubers before they are banked or binned for home use or seed, and educational work is carried on with the growers urging them to select only clean tubers for seed. Recent quarantines issued by Alabama and Mississippi restrict the areas where sweetpotatoes may be planted and the conditions under which they may be grown and require supervision at digging.

"Trapping" sweetpotato weevils.--The trapping of weevils by placing uninfested sweetpotatoes in fields or seedbeds from which all food material has been removed is found effective. On one farm in Mobile County, Ala., 417 weevils were taken by State W. P. A. workers from traps set in this manner. Before harvest the growers are required under State regulations to cut and remove all vines from the rows in order to provide a host-free period. The removal of volunteers is stressed, as several infestations have been found where only one or two volunteers remained in the field. After harvest the fields are thoroughly cleaned of all remaining tubers by "hogging" or plowing them. Under the supervision of an inspector, several weevil-free tubers are then placed in the clean fields at regular intervals to trap any remaining weevils. After about 15 days they are removed and burned. It seems probable that this method may materially reduce the weevil population.

Sweetpotato weevil infestation traced to labor transportation.--In harvesting the Irish potato crop in southern Alabama it was recently learned that truckers, in hauling laborers from a distance, have at several different times taken sweetpotato vines and slips to relatives in other parts of the county, and a recent infestation of sweetpotato weevils was traced to such movement. Such practices in the future will be prevented through State quarantine action and closer supervision of infested areas.

Sweetpotato weevils found in Walthall County, Miss.--Three farms were found infested with the sweetpotato weevil the week ended November 6, in Walthall County, Miss., bordering on known infested counties in southern Mississippi. These are said to be the first infestations known to exist in this county.

Sweetpotato industry in Texas.--Next to wheat, the sweetpotato crop is the largest food crop produced in Texas, with a value of $3,432,000 in 1936, according to the State Agricultural Commissioner. Of the ten leading counties in sweetpotato production in Texas, weevils have been found in two.

Progress in control of peach mosaic and phony peach diseases.--Inspection for the phony peach and peach mosaic diseases has been completed in all States and field work is now concentrated on destroying diseased trees not removed at the time of inspection. Of the 33,000 diseased peach trees which have been destroyed this season, 14,500 were infected with phony peach, and 18,500 with peach mosaic diseases. All known infected trees have been removed from Arkansas, Illinois, Kentucky, Missouri, Utah, and South Carolina. The eradication of abandoned peach trees is going forward in nine other States. In Georgia, phony peach inspection was resumed on September 29, with eight Federal and nine State inspectors. The third survey in the peach mosaic infected area in Colorado this season resulted in finding only 116 diseased trees. In El Paso County, Tex., and the Rio Grande Valley in New Mexico, cooperation in most instances is good and from 75 to 80 percent of the mosaic-infected trees are being removed.

California quarantine on peach mosaic disease radically changed.--Under the peach mosaic disease quarantines of California, as revised in October, an embargo is placed on the movement from the four infected counties in that State, and on the entry from infected counties of other States, of possible carriers of the disease. To the host list of peach mosaic and mosaic diseases of other stone fruits, have been added apricot, almond, prune, and plum trees and cuttings. One county in Oklahoma, in which the peach mosaic disease has recently been reported, has been added to the infected area as well as several counties in other States in which the disease is known to exist.

Peach mosaic in Mexico.--California plant-pest-control officials report that a recent limited inspection in Mexico of that part adjoining the infected area in San Diego County, Calif., showed that the disease was present in the adjoining Mexican area.

J. M. Corliss in charge of transit inspection.--J. M. Corliss, formerly responsible for supervision of transit-inspection stations throughout the Middle West, and the checking of white-pine-growing nurseries in that region for compliance with the blister rust quarantine, was recently placed in charge of these projects throughout the United States.

Transit-inspection activity increased.--In addition to recent assignments of transit inspectors at Alexandria, Va., Memphis, Dallas, and Atlanta, the transit inspection force is being increased at Cincinnati, St. Paul, Indianapolis, and Detroit. Inspectors from the Japanese beetle project are being assigned to the work at Boston, Buffalo, Syracuse, Albany, and New York for Christmas-tree-shipping inspection.

Citrus canker.--Isolated swamp lands in the Galveston-Brazoria areas in Texas, in which citrus canker has been found in recent years, were sought out, inspected, and about 44,000 abandoned and hedge trees destroyed. It was necessary to open a road in order to make these new locations accessible to eradication crews. Twenty-one relief laborers are now employed. No citrus canker was found in October.

Quarantine revisions.--Areas regulated under Federal quarantines relating to the pink bollworm of cotton, the Mexican fruit fly, and the Dutch elm disease, were extended to include small additions under recent revisions of the regulations. The State of Pennsylvania placed a quarantine, effective November 1, prohibiting the planting or growing of host plants of the black stem rust of grains anywhere in the State.

Terminal inspection.--Nevada City, Calif., has been added to the list of points where terminal inspection may be made in that State.

CONTROL INVESTIGATIONS

Susceptibility of insects at different times of year to nicotine.--Further tests by H. H. Richardson and A. H. Casanges at Beltsville, Md., with the adult codling moth confirmed the work of last spring in showing that insect to be very susceptible to nicotine gas, being similar to aphids in this respect. The dosages necessary to kill the adult moth in a 3-minute exposure were approximately the same as those found necessary last spring, indicating that the susceptibility had not changed much over this period of time. Similar results were obtained with the greenhouse thrips (Heliothrips hemorrhoidalis (Bouche)), the green peach aphid (Myzus persicae (Sulz.)), and the bean aphid (Aphis rumicis L.), although the susceptibility of the last-named insect was slightly less than found previously.

Species vary widely in reaction to insecticides.--The variation in resistance of different species of insects to a given insecticide is strikingly shown in laboratory tests reported on by M. C. Swingle and James B. Gahan, of the Sanford, Fla., laboratory. After testing several hundred compounds on six species of laboratory-reared insects, it is almost impossible to say that any one species is generally more resistant than another. The imported cabbage worm and the cross-striped cabbage worm are susceptible to more of the compounds than are the southern armyworm, the diamondback cabbage worm, the cabbage looper, and the cabbage webworm. There is a surprising variation among the last-named species to different compounds. A compound that will kill 100 percent of the armyworm larvae may have no effect whatever on the cabbage webworm, for example. With another compound this resistance may be entirely reversed. A compound is more likely to be toxic to one or a few species and rarely is one found to be generally toxic. The resistance of individuals in a species is also an important item in insecticidal work. There is a difference in resistance among individuals reared from the same female and under identical conditions and this difference increases greatly when rearing conditions are varied or among individuals from a mixed group of females. The reaction to different compounds is a species characteristic rather than an individual one.

INSECTICIDE INVESTIGATIONS

Composition of paris greens manufactured in 1936.--F. E. Dearborn, of the Division of Insecticide Investigations, has reported the results of the chemical analysis of nine brands of paris green manufactured in the United States (Jour. Econ. Ent., v. 30, no. 5, p. 804, Oct. 1937). All the samples were fairly uniform in composition and were not far from the theoretical content of arsenic. The greatest variation was found in the content of water-soluble arsenic, which ranged from 0.47 to 2.12 percent. The physical characteristics of these samples such as density, particle size, and bulking value have been studied by L. D. Goodhue and E. L. Gooden of this Division, and a report of their findings will shortly be published.

Levo-nornicotine found in Nicotiana sylvestris.--C. R. Smith has reported (Jour. Econ. Ent., v. 30, no. 5, pp. 724-727, Oct. 1937) that the alkaloids from N. sylvestris consist of about 95 percent levo-nornicotine and about 5 percent levo-nicotine. Anabasine could not be detected in this species, but is the predominant alkaloid in N. glauca. Ordinary tobacco (N. tabacum) contains mostly levo-nicotine. The genus Nicotiana is of interest in that different species belonging to it contain different alkaloids, which, however, are closely related chemically, and all of which have valuable insecticidal properties.

Errors encountered in analyzing apples for spray residues statistically studied.--An article entitled, "A Statistical Study of the Sampling and Analytical Errors Encountered in Analyzing Apples for Lead Spray Residues", by C. M. Smith and C. C. Cassil, has just been published in the Journal of the Association of Official Agricultural Chemists (v. 20, no. 4, pp. 617-622, Nov. 1937). It gives the results obtained when each of 100 apples from each of several lots was analyzed separately for lead residue, and outlines the conclusions that can be drawn from a statistical consideration of the data. A chart is given from which it is possible to find how many apples per sample are needed to give results of any desired accuracy, so that conclusions as to difference in deposits resulting from different spray schedules, or differences in residue after washing by different procedures, may be soundly judged.

New insecticides patented.--D. L. Vivian and H. L. J. Haller have recently been granted public service patents covering the use as insecticides of a considerable number of synthetic organic compounds. These patents are as follows: 2095939, 2095940, 2095941, and 2096414. Among the compounds covered by these patents are 4-(2,5-dichlorophenylazo)-phenol, p-iodoazobenzene, 4-(p-bromophenylazo)-m-cresol, and 4-(o-tolylazo)-o-toluidine. This Division will be very glad to supply samples of the compounds covered by these patents to entomologists who may be interested in testing them against various insect pests.

Nicotine bentonite protected as an insecticide.--Claude R. Smith has been granted U. S. Patent 2096566, which covers the use of nicotine bentonite as a stomach poison for insects. Although nicotine has been used with bentonite by entomologists for some time, Mr. Smith was the first to show that the nicotine and bentonite combine to form a definite compound. Heretofore it has been assumed that the nicotine was adsorbed by the bentonite just as it is adsorbed by fuller's earth. The reaction between bentonite and nicotine is one of base exchange, similar to that which occurs when a hard water is passed through a zeolite water softener.

Perfume from pyrethrum flowers.--Mr. Haller and F. B. LaForge have found that dihydrojasmone may be made by the treatment of pyrethrum extract with hydrogen in the presence of platinum as a catalyst. Dihydrojasmone has a very pleasant odor in low concentrations and can be used with advantage as a perfume. A process of preparing this compound has been patented in U. S. Patent 2096715 granted on October 26, 1937, to Messrs. Haller and LaForge.

Thermoregulator.--L. D. Goodhue, of the Beltsville, Md., laboratory, has been granted U. S. Patent 2095738 which describes a new thermoregulator.

This device is of the type that depends on the change in vapor pressure of a volatile liquid with change in temperature. Suitable volatile liquids are ether, pentane, or carbon tetrachloride. This thermoregulator does not require sealed-in electrical leads and is made very sensitive by employing the principle of the differential manometer.

BEE CULTURE

Electric fences keep bears from apiaries.--G. H. Vansell and F. E. Todd, of the Pacific States Bee Culture Laboratory, Davis, Calif., who have been working in cooperation with Dr. T. I. Storer of the University of California, on the problem of combating bears in apiaries, report that electric fences can be successfully used for this purpose. Bears so dislike being shocked by electricity, that they react violently from such contact by jumping backward, and then running away. One bear, who had stood up and placed his front feet on the top wire of an electric fence immediately fell backward upon receiving a shock. He then hurried off, and climbed a tree about 75 yards from the fence. Seventeen bears were observed to remain away from an electric fence after receiving one shock. Three different kinds of fences were given field tests under simulated apiary conditions during the summer of 1937 in the Yosemite Valley through the courtesy of officials in the National Park Service. The results indicate that any type of fence giving a strong shock and capable of operating for a long period without undue attention is apparently satisfactory. As a rule, battery devices will be necessary for operation of fences about mountain apiaries because of their remote location away from power lines. It was found that a sturdy fence with about four positively charged wires carried on insulators is required. Posts must be set firmly and spaced not over 12 feet apart. The construction of effective fences has been studied in both moist and dry locations. Alternate "hot" (positive) and ground (negative) wires were tried but are apparently not sufficient, as the dense fur on the bear's body serves as an insulating medium. Best results are had when all the wires of the fence are connected to one side of the high frequency output and the other side is grounded. Where the soil becomes very dry, as in much of interior California during the summer months, a "ground" wire of netting completely around the outside of the fence is necessary. Under conditions where the soil is moist this metallic ground may not be required. Not only have properly designed fences been effective, but the cost of installation and operation are relatively low. The units tried out in these experiments, around commercial apiaries in mountain localities cost from $10 to $40 for materials. Installation is relatively simple. The consumption of current is so low that in the experimental work a set of four dry cells gave satisfactory operation for two months, making the cost about 3 cents a day. As bears are active mostly at night, installation of a sun-operated thermostat would automatically stop current flow during daylight hours, thus increasing the battery life. In one set of experimental apiaries in the Sierra Nevada, where very substantial fences with netting ground were set up, trouble from bears practically ceased. In another instance the results were not so satisfactory, as some bears passed through, but this was in an area where the soil was very dry and no ground netting was used. Much good beekeeping territory in the

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mountains of the Pacific States has not been utilized for honey production because of the menace of bears to apiaries.

Area can be overstocked in relation to available pollen.--Messrs. Todd and Vansell also report that while the broodless apiaries in midsummer are unusual even in California, this condition was experienced in a certain mountainous area this summer. Examination of the colonies showed that the pollen reserve had been depleted and not enough pollen was being obtained in the field to maintain a broodnest. The area was very well stocked with bees. Conditions were checked in a nearby area with a similar flora, but less well stocked, where brood rearing was found to be normal. It was concluded that the first area was overstocked in relation to the quantity of pollen available.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A possibly serious coleopterous pest of roses.--Some coleopterous larvae boring in rose bushes recently submitted by R. K. Fletcher, of the Texas Agricultural Experiment Station, College Station, Tex., were determined by A. G. Boving as Chrysobothris sp.

European ant new to United States.--Several specimens of ants collected by A. B. Gurney in a pile of sawdust near Priest Bridge on the Defense Highway about 13 miles from Annapolis, Md., were identified by M. R. Smith as Ponera punctissima Roger, a European species hitherto not recorded from the United States. It is the sixth species of the genus Ponera recorded from America north of Mexico and is of special interest in that it has an ergatandrous form among its various castes. Since the genus is primitive in habit, P. punctissima is not expected to be economically important.

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